the subclavian arteries, convulsions take place, strictly limited to the hinder part of the body. The second has to do with the vaso-motor apparatus. The rise of arterial pressure, which is produced by arresting the entrance of air into the lungs, is usually attributed to a stimulant effect of the non-aerated blood upon the general vaso-motor centre in the medulla. Luchsinger shows that spasmodic contraction of the arterioles may be produced by the action of venous blood on the spinal cord after its separation from the medulla, or after the functional vitality of the latter has been abolished, in consequence of ligature of the vessels which supply it with blood. This experiment affords proof of the existence of independent vaso-motor centres in the cord. Lastly, it is usually taught that in picrotoxin, the active principle of the *Cocculus Indicus,* we have a poison which causes tetanic spasms by its selective action on a hypothetical "convulsion-centre" in the medulla oblongata. Luchsinger finds that it may cause convulsions in a part of the body whose innervation is derived from the spinal cord alone, and concludes that its operation is not restricted to any single "convulsion centre," but is coextensive with the motor elements in the gray matter of the anterior horns. The general inference from all the above lines of inquiry is that the proximate centres for all the functions of the trunk are situated in the spinal cord, and not restricted to its upper, highly specialized extremity.—*London Med. Record,* May 15, 1878.

MATERIA MEDICA AND THERAPEUTICS.

Toxic Properties of Carbolic Acid in Surgical Use.

IN the course of four years' experience of the antiseptic treatment, Dr. KÜSTER (Berlin) had met with five cases of poisoning by carbolic acid, four of which were fatal. On examining the literature of the subject, he had found seven mild cases of carbolic acid poisoning with one death, and thirteen severe cases with five deaths. His first case occurred in a woman aged 23, who had a stricture of the rectum, in the treatment of which the parts were repeatedly washed with a 2 per cent. solution of carbolic acid. This was twice followed by collapse, which was so severe the second time that she only recovered after employing artificial respiration for an hour. She died soon afterwards of pyæmia, and at the necropsy a large abscess-cavity was found surrounding the rectum, which might have contributed to the retention and absorption of the injected fluid. In a second case, the washing out of an empyematous cavity in a child with a 2½ per cent. solution of carbolic acid was followed by collapse, and death in three hours. In a third case, a woman, aged 39, had pelvic periostitis and discharge of pus through the bladder. Incision and washing out of the cavity with solution of carbolic acid were followed by collapse and a fall of temperature to 35° Cent. (95° Fahr.), and a second irrigation with a 5 per cent. solution, the next day, was followed by sudden death. The fourth case was one of resection of the hip in a child aged four and a half, who died unexpectedly the next day. The fifth death occurred in a woman aged 33, who, in consequence of erysipelas following an injury of the leg, had a large abscess under the right gluteus muscle, and suppuration of one knee. Death took place four hours after the suppurating cavities had been opened and injected with solution of carbolic acid. Not being able to ascribe these sudden deaths to shock, he made some experiments, to determine the question whether, as was probable, carbolic acid exerted a poisonous action in such cases. It had already been established by the experiments of others that cold-blooded animals were killed by small doses, while warm-blooded animals required large quantities, ten to twenty grammes (two and a half to five drachms), according to the French, while Husemann had calculated the fatal dose for dogs at 0.5 *per mille* of the weight of the body. Dr. Küster had found that, in relation to the body-weight, the smallest immediately fatal dose was 0.036 per cent., the largest 0.075 per cent. of a five per cent. solution of carbolic acid injected into the blood. The injection of seven and a half grammes was followed by trembling, of ten grammes by convulsive movements, and of fifteen grammes by loss of consciousness; half an hour or an hour later the animal recovered. Larger doses produced also loss of reflex irritability; this agreed with Salkowski's experiments, in which irritation was first produced and then paralysis. In man, as in cold-blooded animals, there was no trembling, but there was the well known dark olive-green colouring of the urine—a hitherto unexplained phenomenon—especially after the external use of carbolic acid; there were also gastric symptoms, headache, vertigo, vomiting, increased secretion of saliva, changes in the pupils (more frequently mydriasis), dysphagia, a rise of temperature with small doses, a fall with larger doses, and a rise after the use of the remedy, or a further fall until death occurred. Dr. Küster was inclined to refer the so-called aseptic fever of Volkmann partly to the action of carbolic acid; and he also suspected the existence of a carbolic marasmus, leading to death. Just as in diseased animals small doses led to fatal poisoning, so in anemic subjects, exhausted by loss of blood, the poison acted more intensely, in consequence of being more readily absorbed. Carbolic acid was especially ill borne in septic fevers, and also in children, who were often in a cachectic state when brought under treatment. There was a local as well as an individual predisposition to easy absorption. Pneumonia and œdema of the lungs were mentioned as sequelæ of carbolism. Glauber's salt had been recommended as an antidote, but, according to Dr. Küster, was useful only in mild cases. He had not been able to avert death by following carbolic acid injection by an injection of the salt, nor by injecting a mixture of the two in solution. He recommended the greatest caution in the use of carbolic acid. In all possible cases he substituted for it chloride of zinc, which, even when used in strong solution (8 per cent.), did not interfere with union by the first intention. He counselled caution in washing the abdominal cavity, and advised that, for children, the strength of the solution of carbolic acid should not exceed 1½ per cent.

Dr. LÜCKE believed that mild forms of carbolism were frequent, but he had never seen a fatal case. The peculiar colour of the urine could not always be taken as a guide, since it often only appeared after several hours' exposure to the air. A more sure test was the use of sulphuric acid and chloride of barium; the absence or deficiency of the white deposits of sulphate of baryta indicated that a certain amount of sulphocarbolic acid had been formed (Sonnenburg). In his experience, the carbolic acid spray produced slight toxic symptoms. He also believed that he had met with a carbolic nephritis, especially in children, and also in an adult.

Drs. BARDELEBEN, KOENIG, and HÜTER had never observed dangerous carbolism. The former recommended mixtures of carbolic acid and sulphate of zinc, and jute impregnated with a 5 per cent. solution of chloride of zinc; the latter recommended the stronger solution of carbolic acid, which more quickly produced coagulation.

Dr. OLSHAUSEN had seen in a parturient woman with rupture of the cervix uteri, carbolism, with loss of consciousness, mydriasis, twitchings of the muscles, but with normal action of the heart and respiratory organs, produced by once washing the uterus with a strong solution of carbolic acid; the symptoms apparently disappeared after three hours. Death, however, soon followed, in consequence, as the necropsy showed, of the passage of carbolic acid into the peritoneal cavity. It was remarkable that an unsparing use of the carbolic acid spray was, as a rule, borne well, while, when he changed his dressings for the first time at the end of five or six days, the result not unfrequently was the appearance of carbolic acid in the urine. He could only explain this by assuming that, under Lister's dressing, the skin was relaxed, and its absorbent power increased. In another lying-in woman, the washing out of a pelvic abscess and the hourly application of pledgets of cotton-wool, soaked in a 2 per cent. solution of carbolic acid, were followed in twelve hours by carboluria and collapse; the use of a 5 per cent. solution on the next day was followed by a return of the symptoms, and by death.

Dr. Hahn had seen the application of carbolized jute in a case of gunshot fracture of the arm, followed by nephritis, which disappeared when the treatment was abandoned.

Dr. von Langenbeck recommended great care in the use of carbolic acid. In some persons the existence of idiosyncrasy was beyond doubt. He had met with two fatal cases of carbolic acid poisoning in children in hospital practice.—*London Med. Record*, May 15, 1878.

Therapeutical Properties of Salicylic Acid.

H. Köhler gives (*Med. Chir. Rundschau*, Heft 9, Jahrgang 18) as the result of a large number of experiments with salicylic acid and its salts: 1. That in febrile conditions both salicylic acid and sodium salicylate lower the temperature. 2. That in large doses salicylic acid depresses the respiratory activity, and may even cause death by asphyxia. 3. Salicylic acid does not exist in the blood in the uncombined state, but as sodium salicylate, in which state it is eliminated in man at least by the kidneys. 4. Salicylic acid acts as an antiseptic, but sodium salicylate arrests neither fermentation nor putrefaction. In this point of view it is remarkable, so long as we admit the identity of the action of antiseptics and of the antifebrile action of certain drugs, that both salicylic acid and sodium salicylate lower the temperature in typhus, articular rheumatism, and the febrile state of phthisical patients. Köhler set himself the task of determining whether salicylic acid alone or both it and its salts possessed the power of lowering the temperature in healthy dogs, and he was led in the first instance to notice its effects (*a*) upon the respiration, and (*b*) upon the circulation. He found that both in dogs and in rabbits salicylic acid and sodium salicylate, when ingested into the stomach or injected into the blood, rendered the respiration slower, apparently by depressing the excitability of the sensory nerves, *i. e.*, the branches of the vagus in the lung, leading to asphyxia by carbonic acid poisoning. In regard to the circulation he found that when quickly injected and in large quantities the blood pressure rapidly sank almost to zero, followed by convulsions and death, or in some instances by great retardation of the cardiac movements, with sphygmographic curves of immense height, and a more gradually occurring fatal issue. The causes of this depression lay in the heart itself, and appeared to be due to the action of the drug on the ganglionic apparatus or to paralysis of the muscular tissue of the heart. In regard to sodium salicylate, though not acting so rapidly or powerfully as salicylic acid, its effects are essentially the same. The cardiac branches of the pneumogastric have their excitability lowered, and before death are entirely paralyzed, and the same results occur from the ingestion of sodium salicylate into the stomach as from the injection of salicylic acid into the blood. In regard to the distribution of temperature he found that in healthy rabbits, cats, and dogs, the injection of from six to ten cub. cent. of salicylic acid or sodium salicylate into the jugular vein, or the ingestion of from ten to twenty cub. cent. of solution of sodium salicylate into the stomach, caused a depression of temperature of about three degrees Centigrade (or 5° Fahr.) just as occurs in man during the febrile state. But inasmuch as the sodium salicylate does not possess any antagonistic properties to fermentation and putrefaction, whilst salicylic acid is immediately converted into sodium salicylate after absorption, there is strong reason for not regarding antiseptically acting substances as being also antipyretic. The diminution of temperature observed after their administration can only be partially examined by the above-mentioned modifications of the functions of respiration and circulation, though it undoubtedly goes hand in hand with them ; possibly it may be due to some influence on the vaso-motor nerves leading to dilatation of the peripheric vessels, and consequent lowering of the temperature of the blood; this hypothesis affords an explanation of the congestions of the head, singing in the ear, profuse perspirations, and diuresis observed in many animals.

From all this the following conclusions may be drawn : 1. That it is only when externally or topically applied that salicylic acid acts antiseptically. 2. When salicylate acid is ingested by the mouth it loses its antiseptic action because it becomes united with an alkali, and it then only acts on the economy like sodium salicylate when taken internally. 3. Both salicylic acid when taken internally, and salicylate of soda, though destitute of any antiseptic action, are yet capable of depressing the temperature of the body in febrile conditions to an extent unapproached by any other remedy.

As rules for practice Köhler considers that salicylic acid is exclusively to be used as a topical antiseptic, and in this point of view it is extremely valuable in diphtheritis of the tonsils, pharynx, and nose, where it may be applied in the form of solution containing one part in three hundred. Also as a prophylactic remedy in infectious blennorrhœas, in leucorrhœa, and chronic cystitis, and in dysentery and diarrhœa ; and it is also useful in dyspepsia and the migraine accompanying it, preventing fermentative processes in the stomach ; for this purpose the ferro-salicylate is best adapted. Sodium salicylate can be more readily used on account of its greater solubility. One drachm and a half may be given once or twice in twenty-four hours, which acts more promptly in reducing the temperature in fever than quinine and cold water. Its lowering action on the temperature very rarely fails in acute articular rheumatism, diphtheritis, typhus, or local inflammations. Singing in the ears and deafness are the only inconveniences that occur from the use of sodium salicylate.—*Practitioner*, May, 1875.

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Action of Thermal Applications to the Skin upon the Circulation in the Brain and other Organs.

In the *Practitioner*, April, 1878, the views of Dr. WINTERNITZ upon the *rationale* of the action of hot applications to the skin are expounded, and the experiments upon which these views are based are described. It was found by Golz that by repeatedly percussing the abdomen of a healthy frog the heart can be made to pulsate more slowly, and may even be made to stop altogether. When the tapping ceases, the heart generally remains for some little time in a state of stand-still, and when it again begins to pulsate its condition is the same as if the animal had lost an enormous quantity of blood. The venæ cavæ remain almost empty, the circulation in the web ceases, and arteries which are cut through hardly bleed at all. Where, then, is all the blood, since no vessel has been injured, and no blood whatever has been lost? Golz found, on post-mortem examination, that the vessels of the mesentery, and especially the veins, were enormously distended, although none showed a solution of continuity, showing that the vaso-motor nerves were paralyzed, and these vessels consequently dilated.

Tension thus being decreased in the partially emptied vessels, the heart becomes more and more affected.

A similar result follows the division of the splanchnic nerves, as shown by Asp, von Basch, and others, when all other parts of the body are drained excepting the district of dilatation, so that, in the eye, the contraction of the retinal vessels is clearly seen after division of the splanchnics. Thus we see that in the abdominal vessels, controlled and regulated as they are by the splanchnic nerves, we have an apparatus for regulating the blood-pressure in the body generally, and that increased tension, in any vascular district of the body, may be compensated by dilatation of the abdominal vessels. The whole so-called derivative method depends upon the principles just sketched.

The utility of local and general thermal applications to the surface of the body has long been recognized, but the *rationale* of their action has only recently been scientifically established by the experiments of Schüller. He carefully trephined a rabbit on both sides of the sagittal suture, and observed the vessels of the pia mater. Mechanical pressure over the abdomen caused venous congestion of the pia mater. Pieces of ice laid upon the dura mater caused powerful contraction of all the vessels. Where the superior cervical ganglion of the sympathetic had been removed, the application of ice produced no effect on that side. A cold wet compress on the belly or back of the animal produced, almost without exception, immediate and persistent dilatation of the arteries and veins of the pia mater.

A warm wet compress applied to the belly or back had a contrary effect. The vessels contracted less vigorously, the respiration became quicker and shallower. Plunge-baths, hot and cold, have an analogous but more powerful effect than compresses.

A young man lay two hours, naked, on a bed covered with a blanket; then a thermometer was placed in the auditory meatus, another in the axilla, and a third in the rectum. After the thermometer had indicated a constant temperature for some time, compresses were placed on the legs, reaching from the foot to the knee. After fifteen minutes the ear thermometer began gradually to sink, and reached its lowest point after fifty-five minutes, falling as much as 0.4° C. (0.72° Fahr.). In the axilla the minimum loss of heat was only 0.2° C., while in the rectum the temperature rose 2.0° C.

A further communication is promised upon this interesting subject.—*London Med. Record*, May 15, 1878.

MEDICINE.

Myelogenic Leucocythæmia.

As the result of a long discussion of cases and opinions (*Berliner Klin. Wochenschrift*, Nos. 6, 7, 9, 10, 1878), Professor NEUMANN, of Königsberg, points out that the following conclusions are warranted as to the connection between leukæmia and changes in the marrow of the bones: 1. There are cases of leukæmia, for the development of which no cause can be assigned but disease of the bone-marrow. Hence they may be considered as examples of pure myelogenous leukæmia. 2. No case of leukæmia has as yet been described in which on examination the marrow of the bones has been found normal. Hence there is no objection to the view that leukæmia is *constantly* associated with a pathological alteration of the marrow. 3. The ordinary view that a leukæmia can